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**GUIDANCE FOR PREPARING  
AN AREA OF CONCERN  
REMEDIAL ACTION PLAN**

Prepared for:

GLNPO  
U.S. Environmental Protection Agency  
Region V  
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## APPENDIX

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## 1. FORWARD

This Guidance Document was prepared by USEPA/GLNPO and SAIC as an aid to the Great Lakes States and the preparation of their Area of Concern Remedial Action Plans (RAPs) and the Plans of Study, which will guide the preparation of the RAPs. It contains a detailed description of an AoC RAP which is intended to provide State staff with a thorough understanding of the objectives and content. Also included is a generic table of contents which is intended as an outline for the RAP. Since each AoC is unique, only those items of the outline which are applicable need to be researched, analyzed and reported in detail. However, it is expected that all items of the outline will be considered and if not applicable to an AoC, will be stated so in the report. Since AoCs represent some very complex pollution problems, this approach is intended to ensure that no important aspect or consideration pertinent to the restoration of beneficial uses in the AoC will be inadvertently overlooked.

## 2. DESCRIPTION OF AN AREA OF CONCERN REMEDIAL ACTION PLAN (RAP)

The Table of Contents for a Generic Area of Concern Remedial Action Plan (Section 3.) was developed in response to the 1985 Water Quality Board Report which specifies the content of a RAP as follows:

The RAP will provide an historical record of remedial actions. In addition, a comprehensive file will be developed on each area documenting changes in environmental conditions and providing a reference of significant milestones to be reached in restoring these areas. Historically, water pollution control efforts have been program specific (i.e., they focussed on controlling either point sources or non-point sources). This new Remedial Action Plan emphasis will represent a systematic and comprehensive approach to restoring beneficial uses in Areas of Concern and is consistent with an "ecosystem approach" to the protection of the Great Lakes. Remedial Action Plans are expected to include the following:

- Definition of the environmental problem from surveillance information
- Geographic extent of the area affected (including detailed maps)
- Identification of the beneficial uses which are impaired
- Description of the causes of the problems including identification of all known sources of pollutants involved
- Remedial measures proposed to resolve the problems and restore beneficial uses
- Schedule for implementation and completion of remedial measures
- Identification of jurisdiction and agencies responsible for implementing and regulating remedial measures
- Process for evaluating remedial program implementation and effectiveness
- Description of surveillance and monitoring to track effectiveness of the program and eventual confirmation of restoration of uses.

Remedial Action Plans are expected to be comprehensive documents which examine in detail some of the most complex and persistent pollution problems affecting the Great Lakes. They are intended for use by a broad spectrum of environmental professionals and agency administrative personnel. Although RAPs will be available to the public, they will not be written in a style which seeks to educate as well as inform the layman as is an EIS. Rather, it is presumed that the users have sufficient understanding of applicable environmental programs and pollution control regulations. Thus, extensive descriptive and explanatory narrative of this nature will not be necessary and is available from other sources for those who desire additional information. The following paragraphs briefly describe the purpose, intent and expectations of each of the 13 major sections of a RAP:

- I. **Executive Summary** - This section should briefly synopsise key information which is developed and presented throughout the remainder of the report. It addresses each item of information requested by the Water Quality Board (above). It is recommended that this section be developed upon a body of summarizing tables, charts, graphs, matrices and graphics, which are given continuity with sufficient explanatory narrative to provide clarity and continuity.
- II. **Introduction** - This section is intended to give the reviewer a general understanding of how the subject area came to be recognized as a Class "A" Area of Concern. Unlike previous planning and programs which concentrated on specific pollutant sources (e.g., POTWS, industrial dischargers, CSOs), the RAP will examine the problem from an ecosystem perspective. A discussion of specific objectives for RAPs should be included. Also, as discussed above, it should be explained that RAPs are intended as agency-planning documents and although are available for public examination, are not written in the same manner as public-decision making documents such as EISs and FNSIs.
- III. **Environmental Setting** - The Environmental Setting describes in detail specific characteristics of the Area of Concern which are pertinent to, effect, or are affected by the existing pollution problems. It is

expected that much of this information will be developed on maps and charts.

It is important to recognize that information developed in this section, particularly the "Water Uses", be directly related to use impairments whenever possible. For example, when developing information on the use of the waters for public water supply, it is not sufficient to simply state that a city has three intakes and their locations. The real significance of this involves such factors as:

1. Amount of water processed
2. Population served
3. Pretreatment given the water prior to distribution
4. Routine and periodic testing performed on the water to ensure its safety for human consumption

With this information, the significance and potential risks to human health can be more fully assessed and appreciated.

This type of analytical approach which seeks to determine what specific aspects of subject define a problem and how the discrete pieces are impacted is the overall approach of this section.

The subsection on "Location" should be developed with extensive use of maps. It is particularly important to delineate the Area of Concern in terms of each of the three following geographic definitions:

1. **State/IJC Area of Concern** - This is the area identified by the State and IJC as the Area of Concern for the reasons outlined in the RAP's "Introduction". It generally consists of a river basin or lower portion of a river basin, the mouth of the river and a portion of the nearshore waters of a Great Lake or connecting water body.
2. **Source Area of Concern** - This is the area from which major pollutants of Great Lakes significance are generated or transported and are eventually discharged to the rivers and Lake. It represents the area within which remedial actions could include; a) removal of pollutants at the source, or b) control of pollutants in the pipe or at the point of discharge. The Source Area of Concern is not restricted by river basin boundaries and should include the entire

sewer service area of all POTWs within the State/IJC Area of Concern.

- 3. **Impact Area of Concern** - This consists of that portion of the river(s), the Great Lake and/or its connecting water body which is significantly impacted physically, chemically or biologically by pollutants from the Source Area of Concern. The Impact Area of Concern represents the area where remedial actions could include recovery of pollutants (such as by dredging) and where the benefits of remedial action (i.e., restoration of beneficial uses) will occur. This area could include up to 20 or 30 miles of nearshore Great Lakes Waters and coastline.

Documentation and available data should be referenced in support of each of the three areas delineated.

Under "Natural Features" drainage basin size should be described for both the Area of Concern as well as that portion upstream of the Area of Concern. Topography within the Area of Concern should be discussed in relation to the slope of the river and stream beds which affects velocity, reaeration and assimilative capacity. Hydrology and flows should be documented using USGS gaging station data. Flood and drought flow data should be included. Some discussion of the soil types in the Area of Concern in relation to their drainage characteristics and erosion potential would be useful. Initiating the connection between the Area of Concern and the Great Lakes will require a discussion of pertinent limnological factors such as depth, currents, shoreline erosion/deposition, ice packs, piers, and breakwaters as they affect the mixing and dispersion of polluted discharges from the Area of Concern.

The subsection on "Land Uses" should be developed around a map or maps with the intent of identifying areas which can be characterized by specific types of point and non-point source pollutants. Subsections on "Water Uses" are intended to show the many current uses of the waters in the Area of Concern, some of which conflict with one another and, thus, require management to ensure optimum use opportunities.

Related to the water uses are the "Water Quality Standards, Guidelines", etc. It is important to understand the current applicable water standards as well as any objectives or changes in water standards being

considered. Those should be contrasted with the Applicable Beneficial Uses and the actual uses from the previous subsection.

Finally, the key "Environmental Setting" information should be summarized using tables, matrices and graphics to the extent possible.

- IV. **Definition of the Problem** - Section IV begins with a description of Impaired Uses. The importance of this information cannot be overemphasized as it is the primary justification for initiating subsequent remedial action. Also, restoration of beneficial uses will become the ultimate parameter for measuring the success of any remedial action. Next, the causes of impaired uses should be specifically identified. Information presented should include data on pollutant concentrations and criteria or standard violations. Subsections on "Water Quality", "Sediment Quality" and "Biota" describe the problems in terms of quantifiable parameters. It is important to note that the data and descriptions in this section pertain to in-stream and in-lake conditions related to beneficial uses and use impairment. This is not to be confused with effluent or other discharges which are covered in subsequent sections.
- V. **Sources of Pollution** - This section is intended to identify the primary or original sources and secondary sources of the major pollutants of concern identified in Section IV. Primary sources are those which manufacture, use or produce the materials which subsequently become pollutants. Secondary sources are those which transport, treat, or become receptacles for waste products.
- VI. **Pollutant Transport Mechanisms and Loadings** - This section is intended to describe the route of pollutants from the sources described in Section V to the surface waters. Information should include maps which identify the location of each of the various forms of point-source discharges, the general locations of non-point source pollution and known or suspected areas of contaminated sediment. Estimates of annual pollutant loadings based on monitoring data or special studies should be provided. Estimates of the volume and quality of contaminated sediments as well as the rates of accumulation and transport to the Great Lakes



VII. **Historical Record of Remedial Actions** - This section should provide reviewers with a catalog of completed actions and actions currently being implemented which were undertaken to control pollution, improve environmental conditions or restore beneficial uses. Completed actions may include construction of wastewater treatment facilities and subsequent operation of the completed facilities, or it may simply be a one-time removal of contaminated sediments from a specific location. Actions In-Progress are those currently being implemented but not yet operational or not yet having a recognized beneficial impact.

VIII. **Definitions of Specific Goals, Objectives, and Milestones for Restoration** - This section of the RAP should definitively identify the goals and objectives of remedial action and the milestones to be used in gauging the progress of the program. Goals and objectives should be stated in terms of restored beneficial uses (i.e., revived sport fishery) and/or goals regarding water, sediment or biota (i.e., lifting of a fish consumption advisory). Milestones for gauging progress should be stated in terms of remedial actions planned (i.e., elimination of 75% of the CSO pollutants discharged or dredging of 30,000 cubic yards of contaminated sediment). In addition to uses restored, uses maintained or discontinued should also be discussed. Of particular importance in this discussion are beneficial uses which have been determined to be non-attainable and are, therefore, not expected to be restored even with remedial action.

IX. **Program and Participants** - In this section, all applicable pollution control programs should be discussed relative to their application, implementation and status in the Area of Concern. Also, the extent of all public participation programs and efforts to enhance public understanding of the pollution problems and public support for pollution control efforts should be described. Finally, efforts to promote political implementability should be reviewed. Where additional agreements between political entities and other entities with veto power are necessary to ensure informed consent and cooperation in the implementation of the RAP, these should be detailed.

X. **Remedial Action Steps** - Remedial action steps should be specifically identified and defined to the extent possible. These include ongoing and proposed studies as well as ongoing and proposed construction projects, management practices, and other actions necessary to achieve the restoration of beneficial uses in the Area of Concern. All steps and major sub-steps of the RAP should be described in terms of their specific objectives, the major tasks to be accomplished, and the progress which will be made toward restoration of beneficial uses. A schedule for implementation of each step and major sub-step should take the form of a PERT Chart with the critical path identified. Entities responsible for the completion of each step should also be identified, as well as the estimated costs and the sources and amounts of available funding. This information which specifies the technical steps of remedial action, the schedule, the implementation entities and the funding entities will be the basis for a RAP implementation agreement among all entities involved. Additional provisions to ensure coordination and cooperation among entities should be specified. Finally, the procedures by which implementation of the RAP will be tracked and the success of the actions assessed and should be described.

XI. **Bibliography** - This section should include a listing of all reference material used in preparation of the RAP including key planning and diagnostic works.

XII. **Appendices** - All key supporting data and documentation too detailed for inclusion in the report should be placed in the appendix.

XIII. **Base Map and Overlays** - Each RAP should include one base map approximately 3 to 4 feet in size plus applicable overlays designed to illustrate and summarize certain basic or crucial information. Examples of overlay information would be:

1. State/IJC Area of Concern boundary
2. Source Area of Concern boundary

3. Impact Area of Concern boundary
4. Political boundaries
5. Planning areas and planning entities
6. Sewer service areas (sanitary and combined)
7. Non-sewered areas in the Area of Concern
8. Locations of major interceptors
9. Locations of CSOs and SSOs
10. Location of all POTW discharges
11. Location of all direct industrial dischargers
12. Locations of known areas of malfunctioning septic systems
13. Locations of public and private waste processing and disposal sites (active and closed)
14. Superfund or state designated hazardous waste cleanup site locations
15. Locations of known accumulations of contaminated sediment (in-place pollutants)
16. Locations of completed, on-going and proposed remedial actions

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### **3. TABLE OF CONTENTS FOR A GENERIC AREA OF CONCERN REMEDIAL ACTION PLAN (RAP)**

#### **I. EXECUTIVE SUMMARY**

##### **1. Description and Delineation of Major Concerns**

- Delineation of geographic area
- Definition of existing problems in terms of impaired uses as related to pollutants and concentrations found in water sediment and biota
- Description of principle pollution sources/causes
- Adequacy of the data base

##### **2. Historical Record of Remedial Actions**

- Actions completed since 1972 and currently in operation, including their costs and benefits
- Actions currently being implemented and their estimated costs and expected benefits

##### **3. Remedial Action Steps**

- Description of proposed actions with reference to the remaining concerns and the restoration of specific uses
- Estimated costs and benefits of proposed actions, sources and amounts of available funding
- Schedule for implementation and identification of responsible entities
- Provisions to ensure coordination and cooperation among entities
- Brief description of the surveillance and monitoring program to track implementation, determine effectiveness of pollution control efforts, and evaluate the restoration of beneficial uses

#### **II. INTRODUCTION**

1. Background
2. Purpose and Objectives
3. Intended Use

#### **III ENVIRONMENTAL SETTING**

##### **1. Location**

- Geographic area
- Political jurisdictions

## 2. Natural Features

- Drainage basin size
- Topography, slope
- Hydrology, flow
- Soil types, runoff, erosion
- Limnology (physical/chemical characteristics of nearshore lake areas)
- Air quality (as it effects river and/or lake water quality)

## 3. Land Uses

- Urban/suburban/residential
- Sewer service areas
- Unsewered areas
- Industrial
- Recreational
- Agricultural
- Wildlife habitat/open space

## 4. Water Uses (River/Stream)

- Fish and wildlife habitat
- Water supply
- Commercial fishing
- Sport fishing
- Contact recreation (swimming, boating)
- Navigation
- Noncontact recreation (walking, jogging, bicycling)
- Drainage (urban, suburban, rural)
- Waste disposal (municipal, industrial, uncontrolled)

## 5. Water Uses (Nearshore Lake)

- Fish and wildlife habitat
- Water supply
- Commercial fishing
- Sport fishing
- Contact recreation
- Navigation
- Noncontact recreation
- Drainage
- Waste disposal

## 6. Water Quality Standards, Guidelines, Objectives and Applicable Beneficial Uses

## 7. Summary (tables, matrices, and graphics)

# IV. DEFINITION OF THE PROBLEM

## 1. Impaired Uses, Use Attainability and Specific Concerns

- Eutrophication/impacts on biota
- Commercial fishery demise
- Fish consumption advisories

- Beach closings
- Aesthetics impacts
- Biota (Impairments)
- Toxic impacts on human health (drinking water)
- Need for increased water supply or wastewater treatment

## 2. Major Pollutants of Concern (causing the impaired uses)

- Water Quality Contamination.
  - Chemical
  - Physical (including color, odor, turbidity, etc.)
  - Biological (fecal coliform, etc.)
- Sediment Quality Contamination
  - Chemical
  - Physical
- Biota Contamination
  - Macrobenthos
  - Phytoplankton
  - Fishery

## 3. Summary (tables, matrices, and graphics)

# V. SOURCES OF POLLUTION

## 1. Primary Sources of Major Pollutants

- Domestic wastes (municipal treatment, on-site treatment, other)
- Industries (process wastes, stock piles, storage sites)
- Agriculture (chemicals, livestock wastes, process wastes)
- Public domain (e.g., road salt)

## 2. Secondary Sources of Major Pollutants

- Active and closed public landfills/dumpsites
- Active and closed industrial landfills/dumpsites
- Atmospheric deposition (toxics, nutrients, acids)

## 3. Summary (tables, matrices, and graphics)

# VI. POLLUTANT TRANSPORT MECHANISMS AND LOADINGS

## 1. Continuous Point Sources

- POTW
- Industrial discharges

## 2. Intermittent Point Sources

- Combined sewer overflows (CSOs)
- Sanitary sewer overflows (SSOs)
- Unintentional overflows and bypasses

- Urban stormwater discharges
  - Industrial discharges
3. Non-point Sources
    - Rural and suburban runoff
    - Urban/industrial site runoff
    - Polluted groundwater discharges
    - Atmospheric deposition
    - Discharges from shipping vessels
  4. In-place Pollutants (contaminated sediments)
  5. Summary (tables, matrices, and graphics)

## **VII. HISTORICAL RECORD OF REMEDIAL ACTIONS**

1. Completed Actions
  - Description of construction, management practices, administrative actions, enforcement actions, etc.
  - Costs and source(s) of funding (capital and O&M)
  - Benefits derived/uses restored
2. Actions Currently In-Progress
  - Description of construction, management practices, administrative actions, enforcement actions, planning, studies and projects currently being implemented
  - Estimated costs (capital and O&M) and source(s) of funding
  - Expected benefits to be derived/uses to be restored

## **VIII. DEFINITION OF SPECIFIC GOALS, OBJECTIVES AND MILESTONES FOR RESTORATION**

1. Uses to be Restored, Maintained or Discontinued
2. Goals Regarding Biota and Habitat Restoration
3. Water Use and Quality Objectives
4. Sediment Quality Objectives

## **IX. PROGRAMS AND PARTICIPANTS**

1. Applicable Regulatory and Administrative Programs (including responsible implementation entities)
  - Status of water quality standards, guidelines, and objectives
  - Compliance status of point source controls
    - NPDES permits, control orders, construction grants program
    - consent judgements
    - pretreatment programs
  - Compliance status of hazardous waste control regulations
  - Status of superfund and state hazardous site cleanup

- Status of urban stormwater pollution control efforts
- Status of non-point source control effort or incentives (208)
- Status of COE projects/other agency actions

## 2. Public Involvement

- Public information media
- Citizens advisory committees
- Steering committees
- Public meetings/hearings

## 3. Political Implementability

- Interagency agreements
  - existing
  - additional needed

# X. REMEDIAL ACTION STEPS

## 1. Required Plans and Studies (in progress and proposed)

- Diagnostic studies necessary to establish current or predicted environmental conditions, identify pollutants, determine sources, define the transport mechanisms, or delineate the location of point sources/non-point sources/in-place pollutants
- Planning studies necessary to the development of control and remedial strategies including predictive models
- Laboratory or pilot projects necessary to demonstrate the applicability or effectiveness of potential remedial measures

## 2. Specific Remedial Actions (in progress and proposed)

- Description of construction projects, management practices, administrative actions, enforcement actions, planning, studies, etc.
- Description of the problem addressed, the benefits to be derived (in terms of enhanced environmental quality and beneficial uses restored), the estimated costs and the source and amount of available funding
- Schedule for implementation; PERT chart
- Identification of responsible entities
- Provisions to ensure coordination and cooperation among entities
- Description of the surveillance and monitoring program regarding capacity to track the implementation of actions; determine the effectiveness of remedial actions (in terms of removal, control and recovery of pollutants); and assess the success of remedial actions, with regard to the restoration of beneficial uses

# XI. BIBLIOGRAPHY

# XII. APPENDICES

# XIII. BASE MAP AND OVERLAYS



## 1982 EVALUATION OF REMEDIAL MEASURES IN CLASS "A" AREAS OF CONCERN

for Water Quality Board evaluation:

Remedial measures currently in operation will resolve the identified environmental problems and restore beneficial uses over the near term (5 to 10 years).

Remedial measures currently in operation will not resolve the identified problems and restore uses over the near term; however,

A. Additional programs and measures have been imposed, and these will be adequate and timely.

B. Additional programs and measures have been imposed, and environmental problems will eventually be resolved and uses restored. However, there is a long lag time between completion and operation of the remedial measures and the response of the environmental system.

C. Even though all reasonable remedial measures have been or are being taken, it is doubtful whether the environmental problems will be completely resolved and uses restored.

D. There are apparently no firm programs additionally planned that will resolve problems and restore uses.

Insufficient information has been received or is available in order to make a reasonable judgement as to whether control measures are adequate, or to decide when such measures may be required.

AREA OF CONCERN	SOURCES	ENVIRONMENTAL PROBLEMS AND CONSEQUENCES	REMEDIAL MEASURES	BOARD EVALUATION ADEQUACY OF REMEDIAL MEASURES
Fox River and Southern Green Bay, Wisconsin	Municipal and industrial discharges, in-place pollutants	Water enriched with phosphorus and ammonia. Depressed dissolved oxygen levels. Sediment contaminated with nutrients, oxygen-consuming materials, heavy metals, and PCB. Fishery impaired by PCB and industrial organic chemicals.	Municipal and industrial controls in place to reduce inputs of phosphorus, oxygen-consuming organic materials, and solids. Discharges generally met permit requirements. Waste load allocations being established for BOD, ammonia, solids. Resolution expected of BOD-related dissolved oxygen and ammonia problems. Toxics production-use inventory prepared; industrial effluent analysis required as part of NPDES permit reissuance to define presence of toxic substances; trend-monitoring program for selected toxics; PCB hot-spot identification study.	2B - Municipal and industrial discharges and in-place pollutants 2D - Toxic pollutants
Milwaukee Estuary, Wisconsin	Municipal discharges, combined sewer overflows, in-place pollutants, leaching from landfill	Sediment polluted with nutrients, oxygen-consuming materials, and heavy metals. Fishery impaired by PCB, DDT, industrial and agricultural chemicals. Water violations for metals and ammonia; PCB, DDT, chlordane, and dieldrin present in some discharges. Beach closures resulting from elevated coliform levels.	Present municipal facilities provide phosphorus removal and meet secondary requirements. Milwaukee Master Facilities Plan approved to upgrade conveyance, storage, and treatment facilities. Industrial pretreatment program under development.	2B
Waukegan, Illinois	In-place pollutant	Sediment, water, and fish contaminated with PCB. Fish consumption advisory in place. Dredging and navigation restricted.	Industrial release of PCB substantially reduced. Litigation in progress to resolve in-place contamination.	2D - Programs subject to outcome of litigation
Grand Calumet River and Indiana Harbor Ship Canal, Indiana	Municipal and industrial discharges, combined sewer overflows, industrial waste disposal sites, in-place pollutants	Harbor sediment severely polluted with nutrients, oxygen-consuming materials, heavy metals; also present - organic chemicals associated with heavy industry. Dredging and navigation restricted. Virtually no fish present; those found are contaminated with PCB, agricultural and industrial organic chemicals. Few macroinvertebrates, since sediment habitat consists of oily silt and sludge. Water violations for numerous substances. Beach closures resulting from elevated coliform levels. Adjacent nearshore area of Lake Michigan adversely impacted.	East Chicago STP not in compliance with NPDES permit, enforcement action in progress. Facility contributes to elevated coliform levels; no influent pretreatment to reduce phenols; ammonia pretreatment requirement not met; no facilities to reduce ammonia. New municipal facilities under construction at Gary. Industrial discharges in compliance with NPDES requirements for conventional pollutants; permits being reviewed to determine need for limits on toxics. New wasteload allocations to be established for municipal and industrial dischargers. No plans to eliminate wet-weather combined sewer overflows. Landfill abatement effected as release information becomes available. Indiana water quality standards established to achieve selected uses only.	2C - River and harbor 3 - Impact on adjacent nearshore area of Lake Michigan.
St. Marys River, Michigan and Ontario	Municipal and industrial discharges, combined sewer overflows, in-place pollutants	Sediment polluted with iron, zinc, phenol, and cyanide; benthic fauna impaired. Confined disposal required for dredged material. Phenol violations in water extend across international boundary; ammonia and cyanide violations. Recreational uses restricted, resulting from bacterial contamination.	Second phase of municipal sewage treatment program, when operational, will protect shoreline recreational uses. Control order for Algoma Steel outlines phased effluent loading reduction requirements; action will eliminate transboundary phenol problems. Natural physical and biochemical processes expected to reduce sediment contamination and help restore healthy benthic fauna.	1 - Sources in Michigan 2B - Sources in Ontario

Saginaw River System and Saginaw Bay, Michigan	In-place pollutants, industrial waste disposal sites, nonpoint land runoff	Eutrophication aggravated by cultural enrichment from past municipal and present nonpoint phosphorus loads. Nutrients, sediments, and turbidity from nonpoint land runoff impact trophic state, fish habitat, dissolved oxygen levels, and result in siltation of drainage canals and navigation channel. Sediment contaminated with PCB and PBB. Fishery impacted by PCB, PBB, and dioxin; consumption advisories or bans in effect.	Municipal and industrial control programs generally in place for phosphorus and for conventional pollutants; phosphorus load reductions has led to reduced chlorophyll levels, reduced algal densities, and fewer undesirable algae; taste and odor problems no longer reported. Toxics: effluent limitations, remedial dredging, and site cleanup on a case-by-case basis; adequacy of control measures needs to be established. Major nonpoint source demonstration program currently underway.	1 - Municipal discharges 2D - Nonpoint land runoff 3 - In-place pollutants, industrial sources of toxic substances.
St. Clair River, Ontario and Michigan	Municipal and industrial discharges, combined sewer overflows, in-place pollutants	Sediment contaminated by PCB, mercury, other heavy metals; confined disposal required for dredged material and recovery of benthic fauna impeded. Fishery impacted by mercury and PCB; consumption advisories in effect. Local recreational use limited by bacterial contamination. Phenol violations in water.	Remedial measures being implemented and regulatory actions being taken at area industrial discharges. Bacterial contamination problem will be addressed by sewer separation programs. Study completed to establish presence and distribution of organic substances in ecosystem and identify sources; may lead to additional controls, if warranted. Natural river processes contributing to restoration of ecosystem.	1 - Sources in Michigan 2B - Sources in Ontario
Detroit River, Michigan and Ontario	Municipal and industrial discharges, combined sewer overflows, direct land runoff	Sediment contaminated with PCB and mercury; confined disposal required. Benthic community disrupted downstream of Rouge River. Fishery impacted by mercury and PCB; consumption advisories in effect. Recreational activities are restricted by elevated bacterial levels. Water violations for phenol, iron, conductivity.	Municipal and industrial discharges generally meet effluent and load requirements for phosphorus and for conventional pollutants; water quality improvements noted in western basin of Lake Erie. Measures planned or completed to abate combined sewer overflows on Canadian side and in Ecorse River Basin; overflows also reduced at Detroit, but no plan to further reduce these or direct land runoff into river. Studies planned to establish presence and distribution of organic pollutants in sediment. Hazardous waste disposal sites cleaned up as identified.	2A - Sources in Ontario 1 - Municipal and industrial sources in Michigan, combined sewer overflows in Ecorse River Basin 2C - In-place pollutants 2D - Combined sewer overflows and direct land runoff in Michigan
Rouge River, Michigan	In-place pollutants, combined sewer overflows	Sediment severely degraded. Few fish in river. Water violations for coliform, phenol, iron, conductivity	Industrial dischargers in substantial compliance with NPDES permit requirements. Studies on combined sewer overflows nearing completion.	2D
Washtenaw River, Michigan	In-place pollutants	Sediment severely degraded with conventional and oxygen-consuming materials. Fishery impacted by PCB and industrial and agricultural organic chemicals. Water violations for dissolved oxygen, fecal coliform, heavy metals, and conductivity.	All major dischargers in substantial compliance with NPDES permit requirements. Potential industrial sources of toxic substances being sought.	3
Aurake River, Ohio	In-place pollutants, non-point land runoff	Excess nutrients and sediments from land runoff. Sediment contaminated with conventional and oxygen-consuming materials and heavy metals. Fishery impacted by PCB and industrial and agricultural organic chemicals. Water violations for dissolved oxygen, fecal coliform, heavy metals, and conductivity.	Municipal and industrial dischargers generally meet NPDES permit requirements for phosphorus removal, secondary treatment, conventional pollutants, and/or identified toxic substances. Acute, static bioassay tests performed to establish toxicity of discharges; other toxics control programs under development. Numerous no-till and associated soil conservation demonstration programs in place. Natural processes should contribute to system restoration.	1 - Municipal discharges 2B - nonpoint land runoff, industrial discharges, and in-place pollutants 2D - Combined sewer overflows
Lack River, Ohio	Municipal discharges, in-place pollutants, waste disposal sites	Sediment contaminated with conventional and oxygen-consuming materials, nutrients, and metals. Fishery impacted by PCB and industrial organic chemicals. Water violations for nutrients, dissolved oxygen, coliform, cyanide, heavy metals, and conductivity.	Elyria SIP-industrial pretreatment program planned. Anheist SIP-consent decree to achieve advanced secondary limits. U.S. Steel - remedial program to meet best available treatment requirement. Waste load allocations planned. Two hazardous waste disposal sites cleaned up. Natural processes should contribute to system restoration.	2B

Cuyahoga River, (Cleveland), Ohio	Municipal and industrial discharges, combined sewer overflows, urban land runoff, waste disposal sites, in-place pollutants	Fishery impacted by depressed dissolved oxygen levels, elevated dissolved solids and ammonia, and polluted sediment. Sediment contaminated with conventional and oxygen-consuming materials, nutrients, heavy metals, and PCB; confined disposal required for dredged material.	Akron STP-system upgrading will improve treatment and reduce combined sewer overflows. Cleveland STP's - 2 of 3 facilities meet phosphorus limitations; construction for other requirements is in progress. Two interceptor systems, when completed, will substantially reduce combined sewer overflows. Industrial facilities in compliance with requirements for conventional and toxic pollutants; reviews being conducted to identify need for additional toxics control. Several hazardous waste disposal sites identified, closed, and/or cleaned up.	2C
Ashtabula River, Ohio	Municipal and industrial discharges, in-place pollutants, waste disposal sites	Sediment contaminated with conventional and oxygen-consuming materials, heavy metals, and industrial chlorinated organic substances; confined disposal of dredged material required, and navigation restricted. Fishery impacted by PCB and industrial organic chemicals. Water violations for fecal coliform, heavy metals, and conductivity.	Ashtabula STP-plant improvements will eliminate fecal coliform violations; additional tests to be conducted to establish toxicity of effluent. Industries on Field's Brook have installed treatment facilities to abate conventional and toxic pollutants; studies and evaluations being conducted to establish need for additional toxics controls. Several waste disposal sites cleaned up or under review. Dredging to remove contaminated sediment under way for Ashtabula River and under study for Field's Brook.	2B
Buffalo River, New York	Municipal and industrial discharges, combined sewer overflows, in-place pollutants, waste disposal sites	Sediment severely contaminated with conventional pollutants, heavy metals, industrial organic chemicals, PCB, and pesticides; benthic macroinvertebrate population severely impaired, and confined disposal of dredged material required. Water violations for dissolved oxygen, fecal coliform, heavy metals, and conductivity.	Buffalo STP-corrective action underway to ensure compliance with SPDES requirements; application under development for approval of pretreatment program, in order to abate toxics in influent. Construction program to address combined sewer overflows scheduled to begin in 1984. Lackawanna (C) STP - Construction to lead to phosphorus removal and secondary treatment; no pretreatment program deemed necessary. Industrial and pretreatment discharge limits being developed based on best professional judgement.	2B - Municipal and industrial discharges 2D - Combined sewer overflows and in-place pollutants
Niagara River, New York and Ontario	Municipal and industrial discharges, in-place pollutants, waste disposal sites	Sediment severely contaminated with conventional pollutants, heavy metals, PCB, industrial and agricultural organic chemicals; benthic fauna severely disrupted, and confined disposal of dredged material required. Fishery impacted by PCB, mercury, industrial and agricultural organic chemicals. Water violations for fecal coliform, heavy metals, and several organic substances.	Niagara River Toxics Regulatory Program to address major municipal and industrial discharges, active and abandoned hazardous waste disposal sites; toxic limits and discharge permits to be established for identified sources. Litigation in progress for several prime polluters. Niagara Falls (C) STP - facilities to be completed to remove toxic substances; preliminary steps being taken to develop pretreatment program; diversion project to be constructed. Industrial and pretreatment discharge limits being developed based on best professional judgement.	1 - Sources in Ontario 2B - Sources in New York
Hamilton Harbour, Ontario	Industrial discharges, in-place pollutants	Sediment contaminated with nutrients, PCB, and heavy metals; confined disposal of dredged material required. Depressed dissolved oxygen levels from municipal and industrial discharges, polluted sediments, and algal decay limit harbor as a fish habitat. Water violations for nutrients, cyanide, phenol, iron, zinc, and conductivity. Diminished aesthetic quality and poor water quality deter broader recreational use of harbor.	Stelco and Dofasco - remedial works under construction to eliminate exceedences of load limitations. Hamilton STP - meets operational and phosphorus removal requirements. A water management study is underway to determine further possible remedial measures.	2B - Industrial discharges 2C - In-place pollutants
St. Lawrence River, (Cornwall), Ontario - Massena, New York	Municipal and industrial discharges, combined sewer overflows, in-place pollutants	Sediment contaminated with nutrients, heavy metals, oil and grease, and PCB. Fishery impacted by mercury and PCB; consumption and sale restrictions or advisories exist. Water violations for PCB, heavy metals, and several organic substances. Some restrictions on recreational use exist downstream of Cornwall because of bacterial contamination.	Several discharge violations noted for municipal and industrial dischargers; remedial works under construction to control conventional pollutants, but not phosphorus on New York side. Some controls in place for PCB. Controls for other toxics under consideration, including pretreatment requirements. Controls on municipal sources of bacterial contamination are under development by Ontario and the City of Cornwall. The industrial contributor to the bacterial problem is also to be brought under control.	2B

or Water Quality Board evaluation:

Remedial measures currently in operation will resolve the identified environmental problems and restore beneficial uses over the near term (5 to 10 years).

Remedial measures currently in operation will not resolve the identified problems and restore uses over the near term; however,

Additional programs and measures have been imposed, and these will be adequate and timely.

Additional programs and measures have been imposed, and environmental problems will eventually be resolved and uses restored. However, there is a long lag time between completion and operation of the remedial measures and the response of the environmental system.

Even though all reasonable remedial measures have been or are being taken, it is doubtful whether the environmental problems will be completely resolved and uses restored.

There are apparently no firm programs additionally planned that will resolve problems and restore uses.

Insufficient information has been received or is available to judge whether control measures are adequate, or to decide when such measures may be required.

AREA OF CONCERN	SOURCES AND BOARD EVALUATION ADEQUACY OF REMEDIAL MEASURES	ENVIRONMENTAL PROBLEMS AND CONSEQUENCES	1983 UPDATE - ENVIRONMENTAL CONDITIONS AND REMEDIAL PROGRAMS
Koshong River and Southern Green Bay, Wisconsin	2B -Municipal and industrial discharges, in-place pollutants 2D -Toxic pollutants	Water enriched with phosphorus and ammonia. Depressed dissolved oxygen levels. Sediment contaminated with nutrients, oxygen-consuming materials, heavy metals, and PCBs. Fishery impaired by PCBs and industrial organic chemicals.	Fishery improving but still impaired. Dissolved oxygen levels also improving. Municipal and industrial controls in place to reduce phosphorus, oxygen-consuming organic materials, and solids. Discharges generally met permit requirements. Waste load allocations being established for BOD, ammonia, solids. Resolution expected of BOD-related dissolved oxygen and ammonia problems. Toxics production-use inventory prepared; industrial effluent analysis required as part of NPDES permit reissuance to define presence of toxic substances. Recent study identified 100+ chemicals and some of their sources. Surface areas of PCBs "hot spots" mapped. Additional monitoring and studies needed to develop remedial programs.
Milwaukee Estuary, Wisconsin	2B -Municipal discharges, combined sewer overflows, in-place pollutants, leaching from landfill	Sediment polluted with nutrients, oxygen-consuming materials, and heavy metals. Fishery impaired by PCBs, DDT, industrial and agricultural chemicals. Water violations for metals and ammonia; PCBs, DDT, chlordane, and dieldrin present in some discharges. Beach closures resulting from elevated coliform levels.	Present municipal facilities provide phosphorus removal and meet secondary requirements. Milwaukee Master Facilities Plan approved to upgrade sewage conveyance, storage, and treatment facilities. Major sewage studies underway to determine need for control of combined sewer overflows and dredging of in-place pollutants. Industrial pretreatment program nearing completion. Pretreatment standards established for Cd, Zn, Ni, Cu and Pb standards still undergoing public review. One year study examining HCN and Cr pretreatment standards underway.
Peoria, Illinois	2D -In-place pollutants	Sediment, water, and fish contaminated with PCBs. Fish consumption advisory in place. Dredging and navigation restricted.	Industrial release of PCBs essentially eliminated. Proposed Superfund project to remove, treat, and contain PCB contaminated sediments under review. Design was completed in Fall 1983, construction to begin Spring 1984, and completion expected in 1987. Estimated cost of the project is \$17.4 million. U.S. EPA will attempt to recover costs from Outboard Marine Corp.

Grand Calumet River and Indiana Harbor Ship Canal, Indiana	2C -Municipal and industrial discharges, combined sewer overflows, industrial waste disposal sites, in-place pollutants with respect to impact on river and harbor 3 -Impact on adjacent nearshore area of Lake Michigan	Harbor is severely polluted with nutrients, oxygen-consuming materials, heavy metals; also present - organic chemicals associated with heavy industry. Dredging and navigation restricted. Virtually no fish present; those found are contaminated with PCBs, agricultural and industrial organic chemicals. Few macroinvertebrates, since sediment habitat consists of oily silt and sludge. Water violations for numerous substances. Beach closures resulting from elevated coliform levels. Adjacent nearshore area of Lake Michigan adversely impacted.	Environmental conditions remain unchanged. East Chicago STP not in compliance with NPDES permit, enforcement action in progress. Facility contributes to elevated coliform levels; no influent pretreatment to reduce phenols; ammonia pretreatment requirement not met; no facilities to reduce ammonia. Upgrading and expansion of Gary municipal facilities completed. Combined sewer overflow study completed for cities of Gary, Hammond and East Chicago and is undergoing state review. No plans to eliminate wet-weather combined sewer overflows. Industrial landfills identified; action undertaken under Section 311 of Clean Water Act to contain wastes. Industrial discharges in compliance with NPDES requirements for conventional pollutants; permits being reviewed to determine need for limits on toxics. Indiana water quality standards established to achieve selected uses only. In order to ensure that state water quality standards will be met, study underway to establish municipal and industrial waste load allocations for conventional and other parameters to be permitted by NPDES. No studies proposed to assess impact on Lake Michigan.
St. Marys River, Michigan and Ontario	Municipal and industrial discharges, combined sewer overflows, in-place pollutants 1 - Sources in Michigan 2 - Sources in Ontario	Sediment polluted with iron, zinc, phenol, PCBs, and cyanide; benthic fauna impaired. Confined disposal required for dredged material. Phenol violations in water extend across international boundary; ammonia and cyanide violations. Recreational uses restricted, resulting from bacterial contamination.	Fish consumption advisories issued in 1982 for mercury contamination of certain larger species, caused by former upstream sources in L. Superior basin. Transboundary phenol pollution problem due to industrial waste discharges in Ontario, identified by IJC since 1948, continues. Because of economic conditions, Algoma Steel has received 18-month extension (to 1990) in program to reduce suspended solids, cyanide, phenols, sulfates, and ammonia. Possible restoration of original program under quarterly review. Phenol controls expected to resolve transboundary problem by 1987. Study underway to improve Sault Ste. Marie STP, for phosphorus removal and disinfection in order to protect shoreline recreational uses. Natural physical and biochemical processes expected to reduce sediment contamination and help restore healthy benthic fauna. A sediment and benthos identification survey scheduled for 1983.
Saginaw River System and Saginaw Bay, Michigan	1 - Municipal discharges 2D -Nonpoint land runoff 3 - In-place pollutants, industrial sources of toxic substances	Eutrophication aggravated by cultural enrichment from past municipal and present nonpoint phosphorus loads. Nutrients, sediments, and turbidity from nonpoint land runoff impact trophic state, fish habitat, dissolved oxygen levels, and result in siltation of drainage canals and navigation channel. Sediment contaminated with PCBs and PBBs. Fishery impacted by PCBs, PBBs, and dioxin; consumption advisories or bans in effect.	Municipal and industrial control programs generally in place for phosphorus and for conventional pollutants; phosphorus load reduction has led to reduced chlorophyll levels, reduced algal densities, and fewer undesirable algae; taste and odor problems no longer reported. Toxics: effluent limitations, remedial dredging, and site cleanup on a case-by-case basis; adequacy of control measures need to be established. In 1983, EPA and Michigan proposed a major study of sources, and extent of contamination by dioxin, furans, and related substances in the vicinity of Dow Chemical in the Midland area. Dow's new permit requires detailed wastewater characterization and dioxin bio-uptake study. Dredging to remove sediment highly contaminated with PCBs from Shiawassee River completed. Hazardous waste disposal site at Velsicol has been encapsulated. Major nonpoint source demonstration program and a Michigan DNR study for in-place pollutants in Pine River currently underway.

<p>Clair River, Ontario and Michigan</p>	<p>Municipal and industrial discharges, combined sewer overflows, in-place pollutants 1 - Sources in Michigan 2B - Sources in Ontario</p>	<p>Sediment contaminated by PCBs, mercury, other heavy metals; confined disposal required for dredged material and recovery of benthic fauna impeded. Fishery impacted by mercury and PCBs; consumption advisories in effect. Local recreational use limited by bacterial contamination. Phenol violations in water.</p>	<p>Mercury levels in fish continue to decline, but consumption advisories remain in effect because of mercury and PCBs. Dioxins and organic lead have now been identified in fish. Phenol levels in 1982 complied with Agreement objectives along the Ontario shoreline. Fish collection program established downstream from Ethyl Canada as part of routine sport fish contaminant monitoring program.</p> <p>Remedial measures are being implemented and regulatory actions being taken at area industrial discharges. However, industrial waste control programs at the Sun Oil Refinery in Ontario delayed. Study of industrial effluents by OMOE and Environment Canada is expected to be completed in December 1983.</p> <p>Bacterial contamination problem will be addressed by sewer separation programs. Studies to establish presence and distribution of organic substances in ecosystem and identify sources may lead to additional controls, if warranted. Natural river processes contributing to restoration of ecosystem.</p>
<p>Detroit River, Michigan and Ontario</p>	<p>2A - Sources in Ontario 1 - Municipal and industrial sources in Michigan, combined sewer overflows in Ecorse River Basin 2C - In-place pollutants 2D - Combined sewer overflows and direct land runoff in Michigan</p>	<p>Sediment contaminated with PCBs and mercury on the U.S. side; confined disposal required. Benthic community disrupted downstream of Rouge River. Fishery impacted by mercury and PCBs. Consumption advisories in effect. Recreational activities are restricted by elevated bacterial levels. Water violations for phenol, iron, conductivity.</p>	<p>Municipal and industrial discharges generally meet effluent and load requirements for phosphorus and for conventional pollutants; water quality improvements noted in western basin of Lake Erie. 1982 studies: sediments contaminated with heavy metals, phthalates, and PAHs. Water quality objectives exceeded for phenols, iron, copper, mercury and zinc.</p> <p>Measures planned or completed to abate combined sewer overflows on Canadian side and in Ecorse River Basin; overflows also reduced at Detroit, but no plan to further reduce these or direct land runoff into river.</p> <p>Detroit Wastewater Treatment facilities are being upgraded with installation of level control weirs to replace existing control gates. Construction expected to commence October 1983 will be completed July 1984. In order to carry out the construction, some of the flow will by-pass secondary treatment for an estimated 150 days in 1983. Improved treatment will be beneficial for the Great Lakes and minimal short-term effects expected.</p> <p>Feasibility and environmental impact of disposing of Detroit municipal sludge by mixing with existing chemical sludges on Fighting Island under study.</p> <p>Hazardous waste disposal sites cleaned up as identified. No studies planned to assess impact of in-place pollutants.</p>
<p>Rouge River, Michigan</p>	<p>2C - In-place pollutants, combined sewer overflows</p>	<p>Sediment severely degraded. Fishery impaired. Water violations for phenol, iron, conductivity.</p>	<p>Industrial dischargers in substantial compliance with AEC permit requirements.</p> <p>Study of problems associated with combined sewer overflows completed. After consideration of costs and benefits, the Federal District Court concluded that corrective actions for combined sewer overflows in the Rouge River are not presently warranted.</p>

10. Raisin River, Michigan	3 - In-place pollutants	Sediment severely degraded with heavy metals and oxygen-consuming materials. Fishery impacted by PCBs and industrial and agricultural organic chemicals. Water violations for dissolved oxygen, fecal coliform, heavy metals, and conductivity.	<p>All major dischargers in substantial compliance with NPDES permit requirements. Potential industrial sources of toxic substances being sought.</p> <p>Waste load allocation and environmental impact study in progress, with emphasis on sources, transport, fate, and effects of toxic contaminants, and on development of procedures to assess alternative remedial measures.</p>
11. Maumee River, Ohio	1 - Municipal discharges 2B - Nonpoint land runoff, industrial discharges, and in-place pollutants 2D - Combined sewer overflows	Excess nutrients and sediments from land runoff. Sediment contaminated with conventional and oxygen-consuming materials and heavy metals. Fishery impacted by PCBs and industrial and agricultural organic chemicals. Water violations for dissolved oxygen, fecal coliform, heavy metals, and conductivity.	<p>Municipal and industrial dischargers generally meet NPDES permit requirements for phosphorus removal, secondary treatment, conventional pollutants, and/or identified toxic substances. Facility improvements are being undertaken where problems arise. Perrysburg STP and the city of Oregon report non-compliance for effluent phosphorus concentrations. Study of combined sewer overflow problems at Toledo, Perrysburg, Oregon are continuing, but funds for remedial programs not likely to be available.</p> <p>Sun Oil Company violated permit restrictions for ammonia. Libby-Owens-Ford Company for pH, and Standard Oil of Ohio reported non-compliance with permit limitations due to stormwater management problems. Acute, static bioassay tests performed to establish toxicity of discharges; other toxic control programs under development.</p> <p>Numerous no-till and associated soil conservation demonstration programs in place. Projects to control soil erosion demonstrate that reductions in soil and phosphorus can be achieved for a variety of soil conditions by various tillage practices.</p> <p>Natural processes should contribute to system restoration. Sediment in outer Toledo Harbor appears to be less contaminated and may be acceptable for open lake disposal; decision is dependent upon the results of bioassessment studies to be conducted in late 1983.</p>
12. Black River, Ohio	2B - Municipal discharges, in-place pollutants, waste disposal sites	Sediment contaminated with conventional and oxygen-consuming materials, nutrients, and metals. Fishery impacted by PCBs and industrial organic chemicals. Water violations for nutrients, dissolved oxygen, coliform, cyanide, heavy metals, and conductivity.	<p>1980 study identified high incidences of liver and lip cancers in fish from the lower river, corresponding to a high body burden of PAHs, phenanthrene, and benzo(a)pyrene. State Health Department issued consumption advisory in 1983. Water swimming, and water skiing also not advised. Additional studies underway to establish extent and magnitude of probable human health risks from PAHs, and remedial programs required.</p> <p>Elyria STP contributes to problems; industrial pretreatment program planned; completion of additional facilities delayed from 1985 to 1988 for lack of funds. Amherst STP-consent decree to achieve advanced secondary limits.</p> <p>U.S. Steel - remedial program to meet best available treatment requirement. Waste load allocations planned. Ammonia effluent violations experienced by U.S. Steel; maintenance program initiated.</p> <p>Two hazardous waste disposal sites cleaned up. Study underway to assess cleanup effort at Ford Road landfill.</p> <p>Natural processes should contribute to system restoration.</p>

<p>hoga River, (Cleveland), Ohio</p>	<p>2C -Municipal and industrial discharges, combined sewer overflows, urban land runoff, waste disposal sites, in-place pollutants</p>	<p>Fishery impacted; depressed dissolved oxygen levels, elevated dissolved solids and ammonia, and polluted sediment. Sediment contaminated with conventional and oxygen-consuming materials, nutrients, heavy metals, and PCBs; confined disposal required for dredged material. Water violations for dissolved oxygen, phenol, fecal coliform and several heavy metals.</p>	<p>River still severely impacted by municipal and industrial point source discharges, nonpoint sources, combined sewer overflows and hazardous waste disposal sites. Some improvement in dissolved oxygen levels.</p> <p>Akron STP-system upgrading will improve treatment and reduce combined sewer overflows. Phosphorus removal at Cleveland Southerly plant on line December 1982; additional construction rescheduled for 1989. Completion of construction at Cleveland Westerly STP delayed from 1983 to 1984. Cleveland Easterly STP now meeting phosphorus removal requirements; other construction completed in Summer of 1983. Two interceptor systems, when completed, will substantially reduce combined sewer overflows. Completion of the Southwestern Interceptor delayed from 1990 to 1993. All municipal construction delays due to the lack of funds.</p> <p>Industrial facilities in compliance with requirements for conventional and toxic pollutants; reviews being conducted to identify need for additional toxics control. Several hazardous waste disposal sites identified, closed, and/or cleaned up.</p>
<p>Ashtabula River, Ohio</p>	<p>2B -Municipal and industrial discharges, in-place pollutants, waste disposal sites</p>	<p>Sediment contaminated with conventional and oxygen-consuming materials, heavy metals, and industrial chlorinated organic substances; confined disposal of dredged material required, and navigation restricted. Fishery impacted by PCBs and industrial organic chemicals. Water violations for fecal coliform, heavy metals, and conductivity.</p>	<p>1980 studies confirmed PCB and HCB contamination of fish caught in lower river and harbor; consumption advisories issued by State Health Department in 1983.</p> <p>Ashtabula STP-plant improvements will eliminate fecal coliform violations; additional tests to be conducted to establish toxicity of effluent. Industries on Field's Brook have installed treatment facilities to abate conventional and toxic pollutants; studies and evaluations being conducted to establish need for additional toxics controls.</p> <p>Several waste disposal sites cleaned up or under review. Negotiations continue to clean up several hazardous waste disposal sites and to remove contaminated sediments from Field's Brook.</p> <p>Sediments in Ashtabula Harbor were found suitable for open water disposal and reclassified in 1980. Dredging to remove contaminated sediment under way for Ashtabula River.</p>
<p>Buffalo River, New York</p>	<p>2B -Municipal and industrial discharges 2D -Combined sewer overflows and in-place pollutants</p>	<p>Sediment severely contaminated with conventional pollutants, heavy metals, industrial organic chemicals, PCBs, and pesticides; benthic macroinvertebrate population severely impaired, and confined disposal of dredged material required. Water violations for dissolved oxygen, fecal coliform, heavy metals, and conductivity.</p>	<p>Buffalo Sewer Authority secondary wastewater treatment facility in compliance with SPDES effluent requirements in July 1983. Construction design approved for rehabilitation of existing combined sewers. Industrial pretreatment program has been approved by EPA. Lackawanna STP - Construction including phosphorus removal and secondary treatment expected to be completed in 1983; no pretreatment program deemed necessary.</p> <p>Industrial and pretreatment discharge limits being developed based on best professional judgement. Issuance of permits for some industrial dischargers delayed due to lack of federal effluent guidelines. Five major area industrial facilities now out of business.</p>



16. Niagara River, New York and Ontario	Municipal and industrial discharges, in-place pollutants, waste disposal sites 1 - Sources in Ontario 2B - Sources in New York	Severely contaminated with conventional pollutants, heavy metals, PCBs, industrial and agricultural organic chemicals; benthic fauna severely disrupted, and confined disposal of dredged material required. Fishery impacted by PCBs, mercury, industrial and agricultural organic chemicals. Water violations for fecal coliform, heavy metals, and several organic substances.	<p>(Sh) Consumption advisory issued for larger specimens of American eel and coho salmon because of PCBs and mirex levels. Dioxins and other toxic organic compounds identified in sediment, fish, and water from river and its tributaries in industrial disposal sites.</p> <p>Report expected in early 1984 on Niagara River Toxics Investigatory Program addressing major municipal and industrial discharges, active and abandoned hazardous waste disposal sites; toxic limits and discharge permits to be established; identified sources.</p> <p>Litigation in progress for several prime polluters. Industrial pretreatment programs for Niagara Falls, NY STP approved July 1983. Reconstruction of STP expected to be completed March 1, 1985.</p> <p>SPOES permits issued for 16 municipal and industrial facilities, 7 undergoing public review and 4 are being reassessed. Industrial and pretreatment discharge limits developed based on best professional judgement.</p> <p>USGS has completed hydrogeology surveys of 76 disposal sites and reviewed information on 83 additional sites. A report will be released in early 1984.</p>
17. Hamilton Harbour, Ontario	2B - Industrial discharges, 2C - In-place pollutants	Sediment contaminated with nutrients, PCBs, and heavy metals; confined disposal of dredged material required. Depressed dissolved oxygen levels from municipal and industrial discharges, polluted sediments, and algal decay limit harbor as a fish habitat. Water violations for nutrients, cyanide, phenol, iron, zinc, and conductivity. Diminished aesthetic quality and poor water quality deter broader recreational use of harbor.	<p>Rainbow smelt and northern pike (45-75 cm) now suitable for unrestricted consumption. High incidence of tumors and some malformation of gills reported in coarser species of fish; cause under investigation.</p> <p>Sediments in Windermere basin highly contaminated with heavy metals and PCBs, but may not be impacting water quality.</p> <p>Stelco and Dofasco - remedial works under construction eliminate load limit violations. Stelco still not meeting phenol requirements, but Dofasco now in compliance for phenol. Phenol loads reduced because of decreased production levels improved waste treatment at the steel mills.</p> <p>Hamilton STP marginally exceeded phosphorus objective. Further reduction in BOD and ammonia loads may be required to alleviate dissolved oxygen problems. A water management study is underway to determine further possible remedial measures.</p>
18. St. Lawrence River, (Cornwall, Ontario - Massena, New York)	2B - Municipal and industrial discharges, combined sewer overflows, in-place pollutants	Sediment contaminated with nutrients, heavy metals, oil and grease, and PCBs. Fishery impacted by mercury and PCBs; consumption and sale restrictions or advisories exist. Water violations for PCBs, heavy metals, and several organic substances. Some restrictions on recreational use exist downstream of Cornwall because of bacterial contamination.	<p>Several discharge violations noted for municipal and industrial dischargers; remedial works under construction to control conventional pollutants, but not phosphorus on New York side. Loadings of conventional pollutants from Ontario industrial sources reduced in 1982. Controls on municipal sources of bacterial contamination are under development and expansion of wastewater treatment plant and control of combined sewer overflows at Cornwall, Ontario to be completed by 1985.</p> <p>PCBs elevated in water downstream from General Motors Foundry and Reynolds Metals. Other sources of PCBs and heavy metals, and need for further remedial action still under investigation. Some controls in place for PCBs. Controls on other toxics under consideration, including pretreatment requirements. Domtar effluent responsible for occasional high downstream bacterial levels to be brought under control. Control of high phenol levels under study. Dupont of Canada exceeding accepted lead levels.</p>

6. GLWQB's 1985 EVALUATION OF REMEDIAL MEASURES IN CLASS "A" A of Cs

In the past, the Board had not always been clear on how to track and measure progress in areas of concern or how to remove a site from the area of concern list. To alleviate these problems, the Board has adopted a new system of categories which represents a logical sequence for problem solving and resolution. The categories identify the status of the information base, programs which are underway to fill in information gaps, and the status of remedial efforts. Remedial action plans are developed in order to address specific use impairments. Resolution takes place when evidence can be presented that the full compliment of uses has been restored and the site can be removed from the area of concern list in the next Board report.

Specifically, each area of concern will now be described in relation to the following six category sequence:

<u>Category</u>	<u>Explanation</u>
(1) -	causative factors are unknown and there is no investigative program underway to identify causes.
(2) -	causative factors are unknown and an investigative program is underway to identify causes.
(3) -	causative factors known, but Remedial Action Plan not developed, and remedial measures not fully implemented.
(4) -	causative factors known and Remedial Action Plan developed, but remedial measures not fully implemented.
(5) -	causative factors known, Remedial Action Plan developed, and all remedial measures identified in Remedial Action plan have been implemented.
(6) -	confirmation that uses have been restored and deletion as an Area of Concern (in the next Board report).

GRAND CALUMET RIVER AND  
INDIANA HARBOR CANAL (Indiana)

Map Reference No. 14

NATURE OF PROBLEM

Types of Problems

Conventional Pollutants  
Heavy Metals  
Toxic Organics  
Contaminated Sediments  
Fish Consumption Advisories  
Biota Impacted  
Aesthetics

Causes of the Problems

Municipal Point Sources  
Industrial Point Sources  
Urban Non-point  
Combined Sewer Overflows  
In-Place Pollutants

Degraded benthos which consists primarily of sludge worms. Dredging restrictions due to sediment contamination inhibiting navigation. Fish contaminated and few present. Lake Michigan impact not yet quantified.

Sediments are heavily polluted with all metals tested except mercury and with oil and grease. Sediments also polluted to heavily polluted with PCBs.

Dissolved oxygen criteria exceeded but with decreasing frequency and severity.

Sources of pollutants are large deposits of historic in-place pollutants. Heavy industry and municipal dischargers including combined sewer overflows. Eleven waste disposal storage sites within 1/5 mile of the river may be contributing.

PROGRESS TO DATE

Remedial Actions

Municipal and industrial discharges being controlled under terms of court orders, waste load allocation.

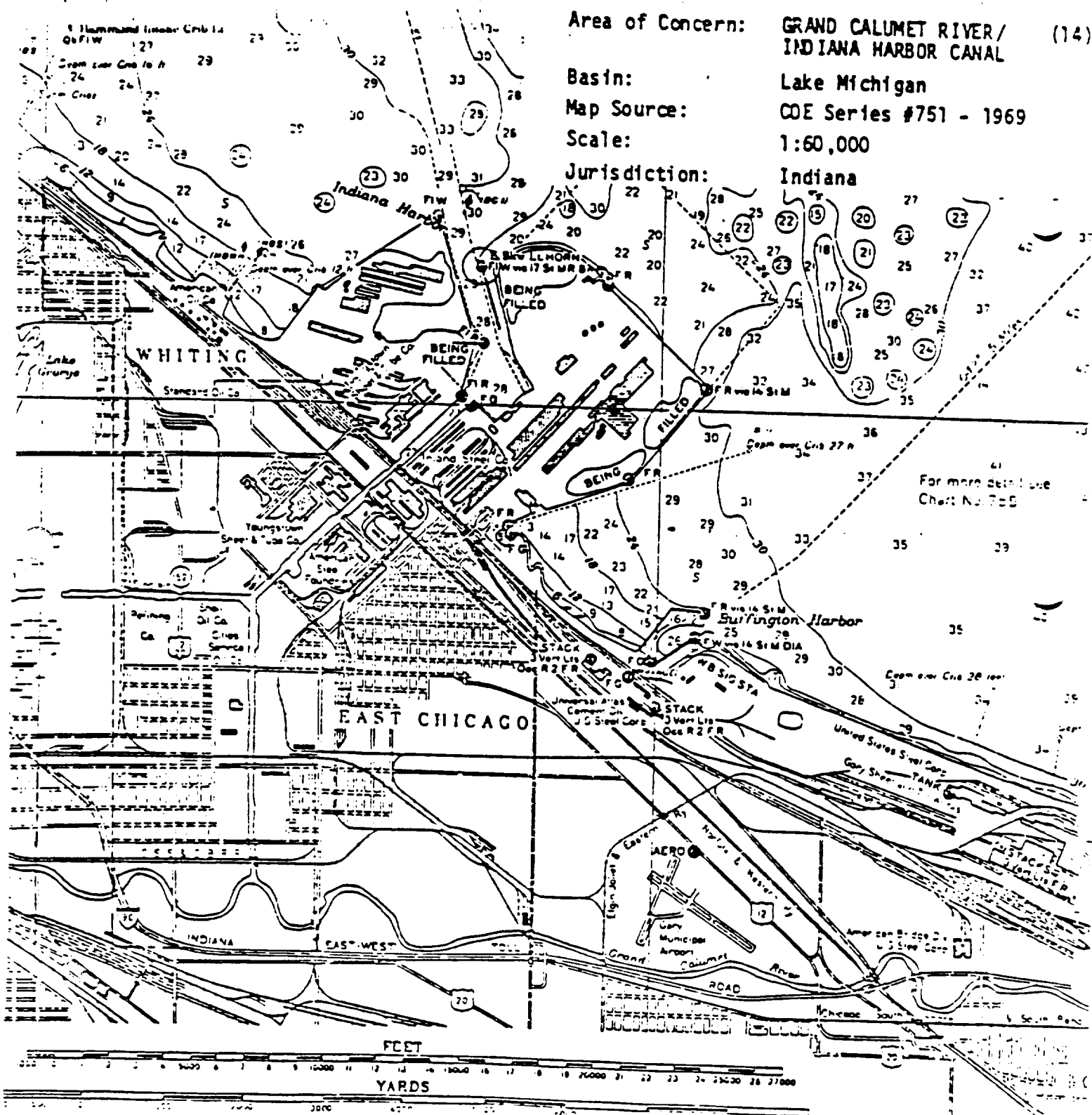
Environmental Improvements

Some recovery is occurring as a result of major reductions in industrial and municipal pollutant discharges. Adult fish are able to survive in the harbor and the sludge worm population has been re-established. There is some evidence that relict biological colonies are recovering and expanding. Water quality is approaching compliance with current Indiana standards.

STATUS OF REMEDIAL ACTION PLAN (Category: 4)

Remedial Action Plans for navigational dredging is being developed by U.S. Army Corps of Engineers and scheduled to be completed by late 1986. U.S. EPA "Master Plan for Improving Water Quality in the Grand Calumet River/Indiana Harbor Canal" was completed in March 1985. Analysis and report of combined sewer overflows impact on harbor and lake are underway.

Figure - Grand Calumet River/Indiana Harbor Canal



RAISIN RIVER (Michigan)

Map Reference No. 24

NATURE OF PROBLEM

Types of Problems

Conventional Pollutants  
Heavy Metals  
Contaminated Sediments  
Fish Consumption Advisories  
Biota Impacted  
Aesthetics

Causes of the Problems

Municipal Point Sources  
Industrial Point Sources  
Urban Non-point  
Rural Non-point  
Combined Sewer Overflows  
In-Place Pollutants

Sediments contaminated with volatile solids, chemical oxygen demand, oil and grease, and metals. Fish contaminated with PCBs and other persistent organic compounds.

PROGRESS TO DATE

Remedial Actions

Provision of secondary treatment for municipal wastewater discharges and Best Practicable Treatment for industrial discharges have reduced loadings of conventional pollutants and heavy metals.

Environmental Improvements

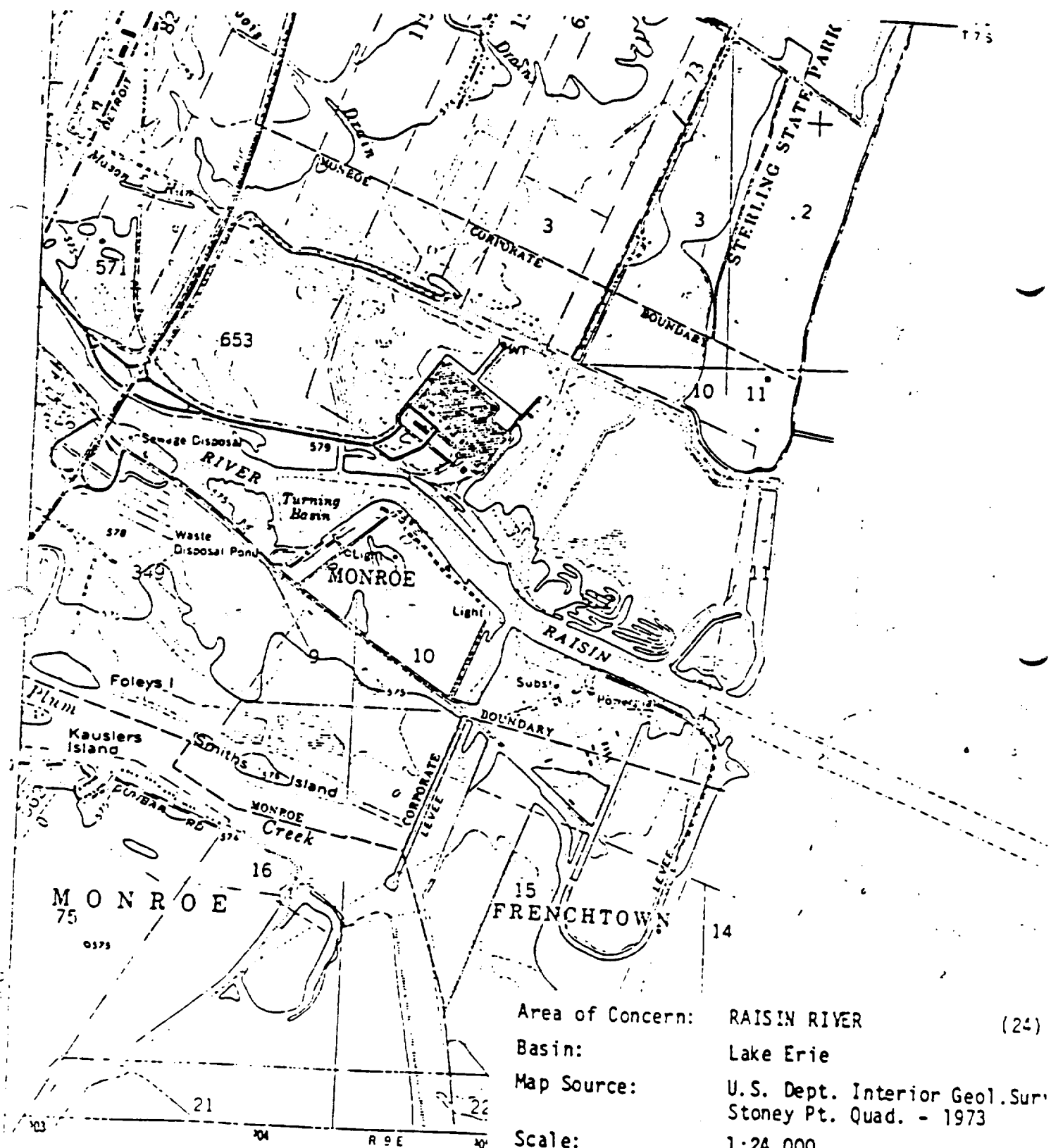
Michigan DNR biologists have reported some improvements in benthic macroinvertebrate community structure and composition in the lower Raisin River over the past 10 years. These improvements are attributed to better municipal and industrial wastewater treatment.

STATUS OF REMEDIAL ACTION PLAN (Category: 2)

U.S. EPA and Michigan DNR are performing a study to determine the extent of the problem and identify the causative factors.

Upon completion of this study, a Remedial Action Plans will be developed.

Figure - Raisin River



Area of Concern: RAISIN RIVER (24)  
Basin: Lake Erie  
Map Source: U.S. Dept. Interior Geol. Surv.  
Stoney Pt. Quad. - 1973  
Scale: 1:24,000  
Jurisdiction: Michigan

ROUGE RIVER (Michigan)

Map Reference No. 23

NATURE OF PROBLEM

Types of Problems

Conventional Pollutants  
Heavy Metals  
Toxic Organics  
Contaminated Sediments  
Fish Consumption Advisories  
Biota Impacted  
Aesthetics

Causes of the Problems

Municipal Point Sources  
Industrial Point Sources  
Urban Non-point  
Rural Non-point  
Combined Sewer Overflows  
In-Place Pollutants

Biota in the lower Rouge River is severely impacted due primarily to contaminated sediments from past discharges and historic in-place pollutants which are replenished by an estimated flow of 6 billion gallons per year from 180 combined sewer overflows.

High fecal coliform bacteria and total dissolved solids concentrations resulting from combined sewer overflows and urban runoff.

PROGRESS TO DATE

Remedial Actions

All major industrial facilities discharging to the Rouge River are in compliance with their NPDES permits. Michigan's industrial pretreatment program is being implemented. Combined sewer overflows are the major problems.

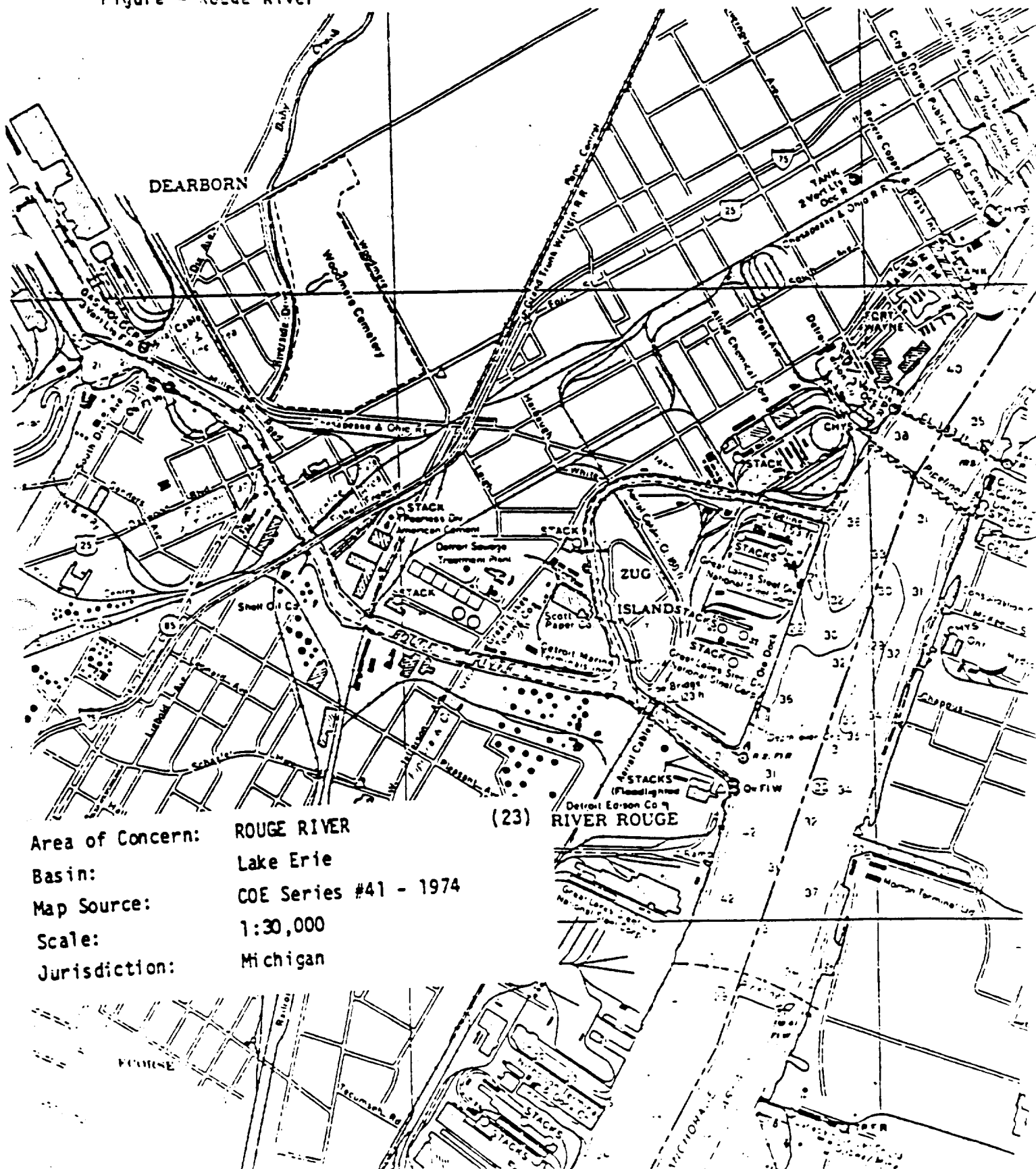
Environmental Improvements

Pickle liquor and oil and grease, which typified the Rouge River in the 1960s, are no longer problems. Winter duck kills, due to oil pollution, no longer occur. It should also be noted that five steelhead were collected or caught in the Rouge River during 1982 and 1983, suggesting some improvement in water quality.

STATUS OF REMEDIAL ACTION PLAN (Category: 3)

Michigan is participating in the development of a Remedial Action Plan for the Rouge River Basin via the Upper Great Lakes Connecting Channels Study.

Figure - Rouge River





## BLACK RIVER (Ohio)

Map Reference No. 26

### NATURE OF PROBLEM

#### Types of Problems

Conventional Pollutants  
Heavy Metals  
Toxic Organics  
Contaminated Sediments  
Eutrophication  
Fish Consumption Advisories  
Biota Impacted  
Beach Closings  
Aesthetics

#### Causes of the Problems

Municipal Point Sources  
Industrial Point Sources  
Urban Non-point  
Rural Non-point  
Combined Sewer Overflows  
In-Place Pollutants  
Waste Disposal Sites

Sediments are contaminated with oxygen-consuming materials, nutrients, and metals. Causative factors which contribute to degradation include sediment contamination from steel industries and past industrial dischargers. Sediments in the area of U.S. Steel have been found to be heavily polluted with heavy metals and PAH.

Water quality is degraded by the Elyria and Lorain sewage treatment plants and by various sources to French Creek. Heavy metals, ammonia and fecal coliform are problem parameters. The river is severely impacted by the discharge from Elyria.

Various forms of cancer have been found in fish in the lower Black River. A 1980 study identified incidences of lip cancers in fish from the lower river corresponding to a high body burden of PAHs, phenanthrene, and benzopyrene.

### PROGRESS TO DATE

#### Remedial Actions

Two hazardous waste disposal sites cleaned up,

An industrial pretreatment program is planned; completion of additional facilities delayed from 1985 to 1988 for lack of funds. U.S. Steel has shut down coke oven operations at the Lorain, Ohio plant. An intensive biological and water quality survey conducted by Ohio EPA in 1982 indicated severely degraded conditions from the Elyria WWT to the river mouth. Small scale surveys are proposed after the Elyria WWT is upgraded.

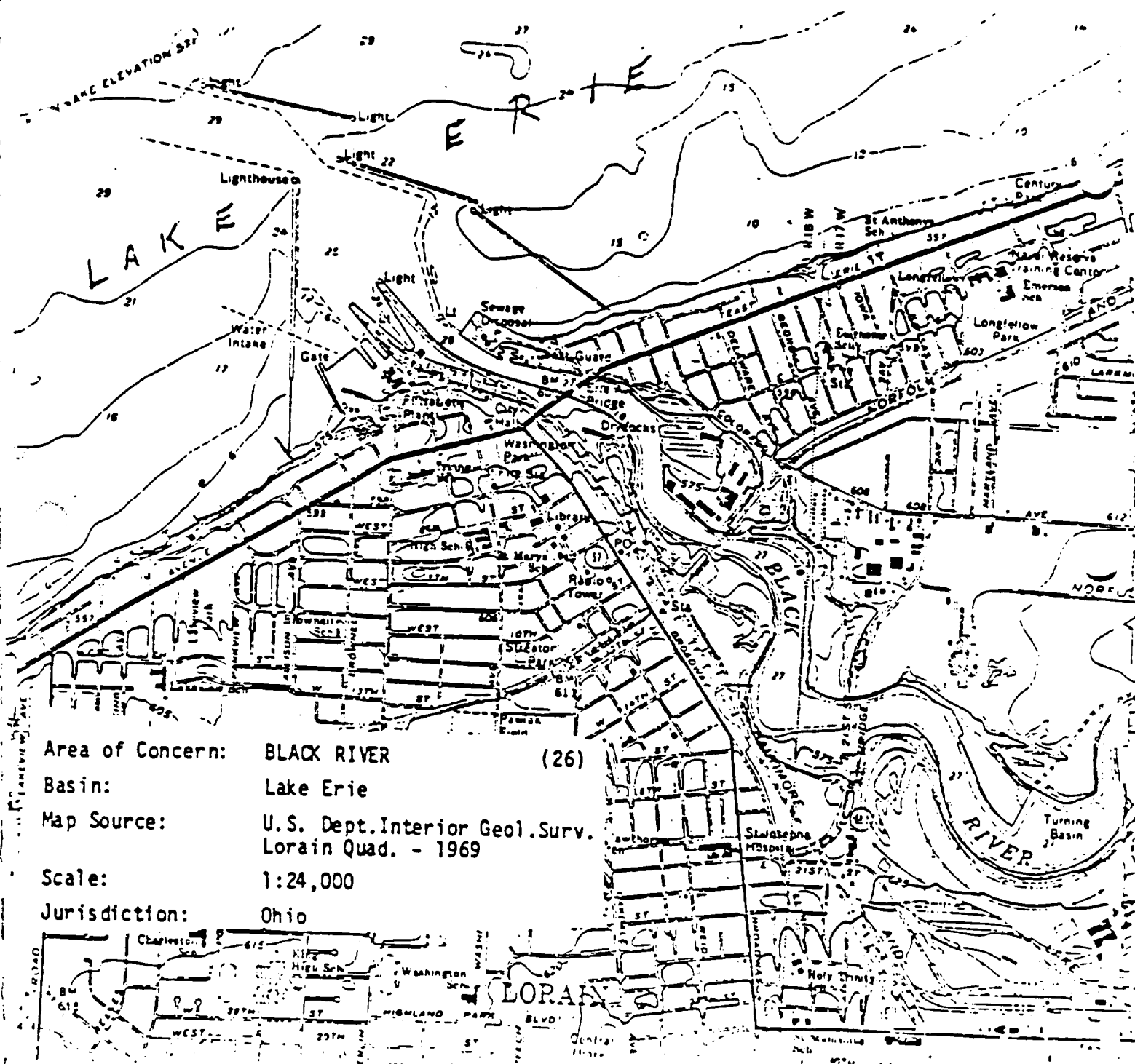
#### Environmental Improvements

Consumption advisory issued by State Health Department in 1983. Wading, swimming, and water skiing also not advised. Additional studies underway to establish extent and magnitude of human health risks.

### STATUS OF REMEDIAL ACTION PLAN (Category: 3)

U.S. Steel has submitted a report to U.S. EPA on the nature of sediment pollution upstream of the federal navigation limits. Dredging and disposal is anticipated based on the results of the report. A Remedial Action Plan is proposed in draft for November, 1986.

Figure - Black River



NATURE OF PROBLEM

Types of Problems

Conventional Pollutants  
Toxic Organics  
Contaminated Sediments  
Fish Consumption Advisories  
Biota Impacted

Causes of the Problems

Municipal Point Sources  
Industrial Point Sources  
In-Place Pollutants

Dissolved oxygen problems continue in estuarine portion of the Fox River. Fishery recovering but reproduction still impaired. Toxic contaminants suspected of causing reproductive problems.

Dissolved oxygen problem at southern tip of Green Bay. Fish contamination with PCBs and furans. Carp fishery closed. Deformities and reproductive problems have been identified in fish-eating birds.

Principal sources of pollutants are pulp and paper industry and municipal wastewater treatment plant discharges.

PROGRESS TO DATE

Remedial Actions

Numerous monitoring activities have identified the problems, waste load allocations have been made for all three river segments. Revised NPDES discharge permits in effect for discharges in upper two segments.

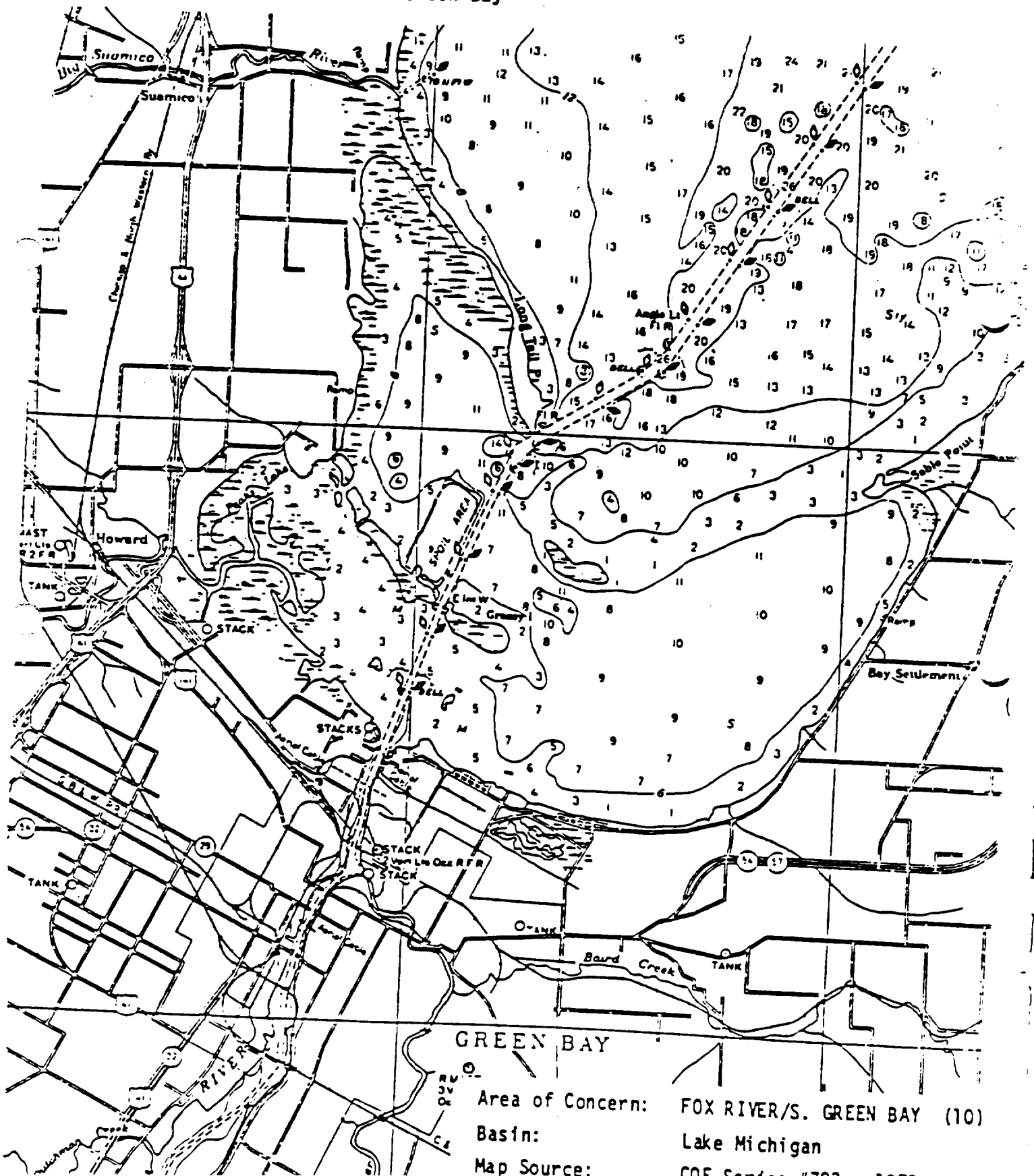
Environmental Improvements

Wastewater treatment improvements already completed or expected to be on line by 1987 will result in water quality standards being met for conventional pollutants even under low flow, high temperature conditions.

STATUS OF REMEDIAL ACTION PLAN (Category: 3)

Research studies underway to determine relationship between environmental contaminants and fish reproduction problems and the problems of hypolimnetic oxygen depletion in the bay. In-place pollutants problem is not being addressed. Proposal for developing a Remedial Action Plan is due by May 1985.

Figure - Fox River/Southern Green Bay



SHEBOYGAN HARBOR (Wisconsin)

Map Reference No. 11

NATURE OF PROBLEM

Types of Problems

Toxic Organics  
Contaminated Sediments  
Fish Consumption Advisories  
Biota Impacted

Causes of the Problems

In-Place Pollutants

Contamination of fishery and sediments with PCBs. Dredging and navigation restricted.

PROGRESS TO DATE

Remedial Actions

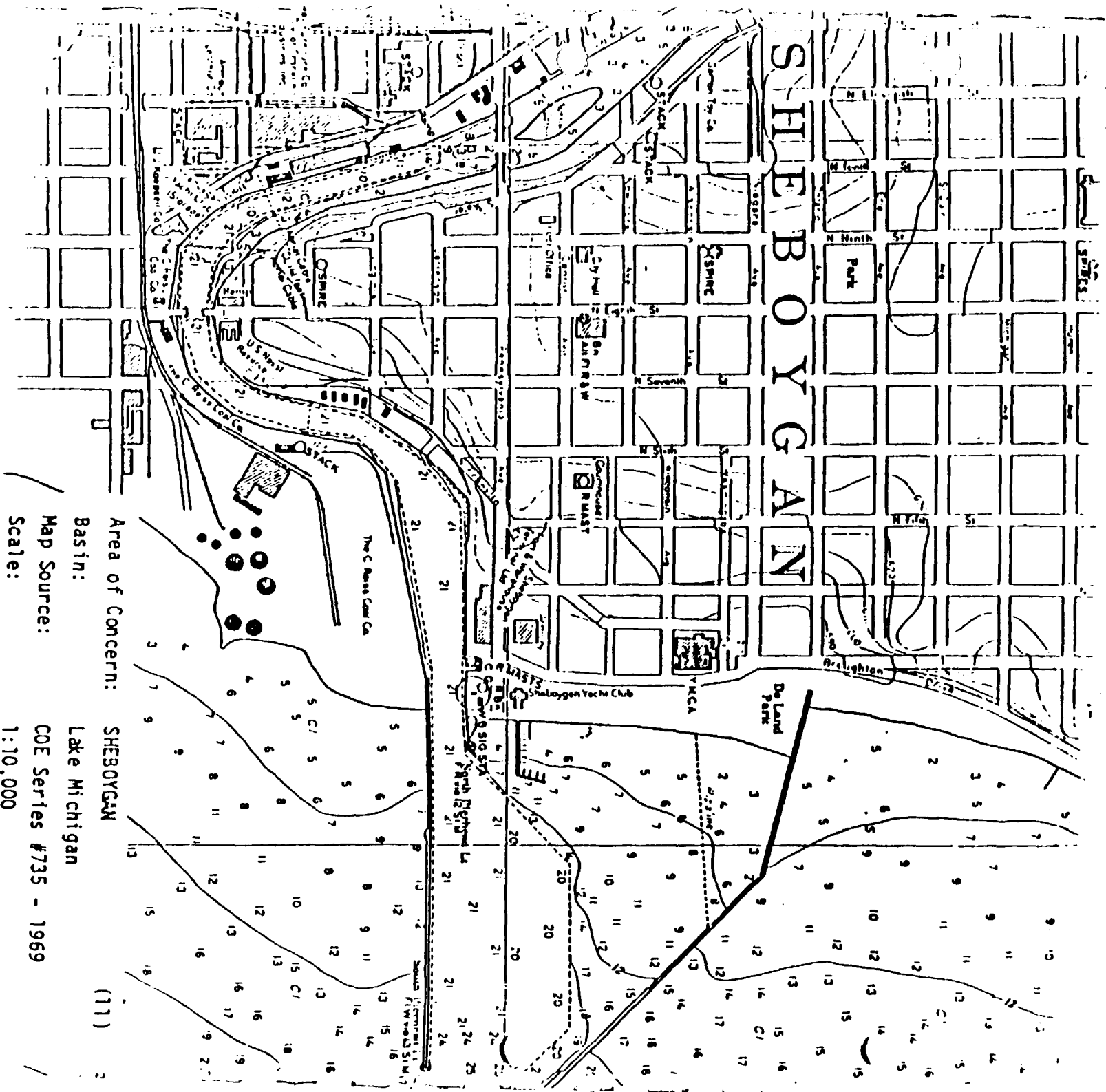
Original source of PCBs cleaned up.

Environmental Improvements

STATUS OF REMEDIAL ACTION PLAN (Category: 3)

Problems have been identified. Studies by Corps of Engineers underway for navigation channel dredging. U.S. EPA, Wisconsin DNR beginning Remedial Investigation Feasibility Study under Superfund. U.S. EPA organizing cooperative study with Corps, State of Wisconsin, and U.S. Fish and Wildlife Service to address Sheboygan in-place pollutants problems as a model for other Great Lakes in-place pollutants problem areas. Remedial Action Plans should be developed by 1986.

Figure - Sheboygan



Area of Concern: SHEBOYGAN (11)

Basin: Lake Michigan

Map Source: COE Series #735 - 1969

Scale: 1:10,000

BUFFALO RIVER (New York)

Map Reference No. 30

NATURE OF PROBLEM

Types of Problems

Conventional Pollutants  
Heavy Metals  
Toxic Organics  
Contaminated Sediments  
Fish Consumption Advisories  
Biota Impacted

Causes of the Problems

Municipal Point Sources  
Industrial Point Sources  
Urban Non-point  
Combined Sewer Overflows  
In-Place Pollutants  
Waste Disposal Sites

Water quality degraded due to conventional pollutants and heavy metals. Sediments contaminated with toxic organics and metals, and conventional pollutants.

PROGRESS TO DATE

Remedial Actions

Municipal and industrial discharges, generally in compliance with SPDES permits. Programs underway to define extent of sediment contamination. Contamination from landfill sites to river still unknown.

Environmental Improvements

Due to economic downturn, loadings have been reduced from a number of industrial dischargers.

STATUS OF REMEDIAL ACTION PLAN (Category: 3)

U.S. EPA (State of New York Task Force) developing Remedial Action Plans. The Niagara River Toxics Committee study providing basis for development of Remedial Action Plans.

( 30 )

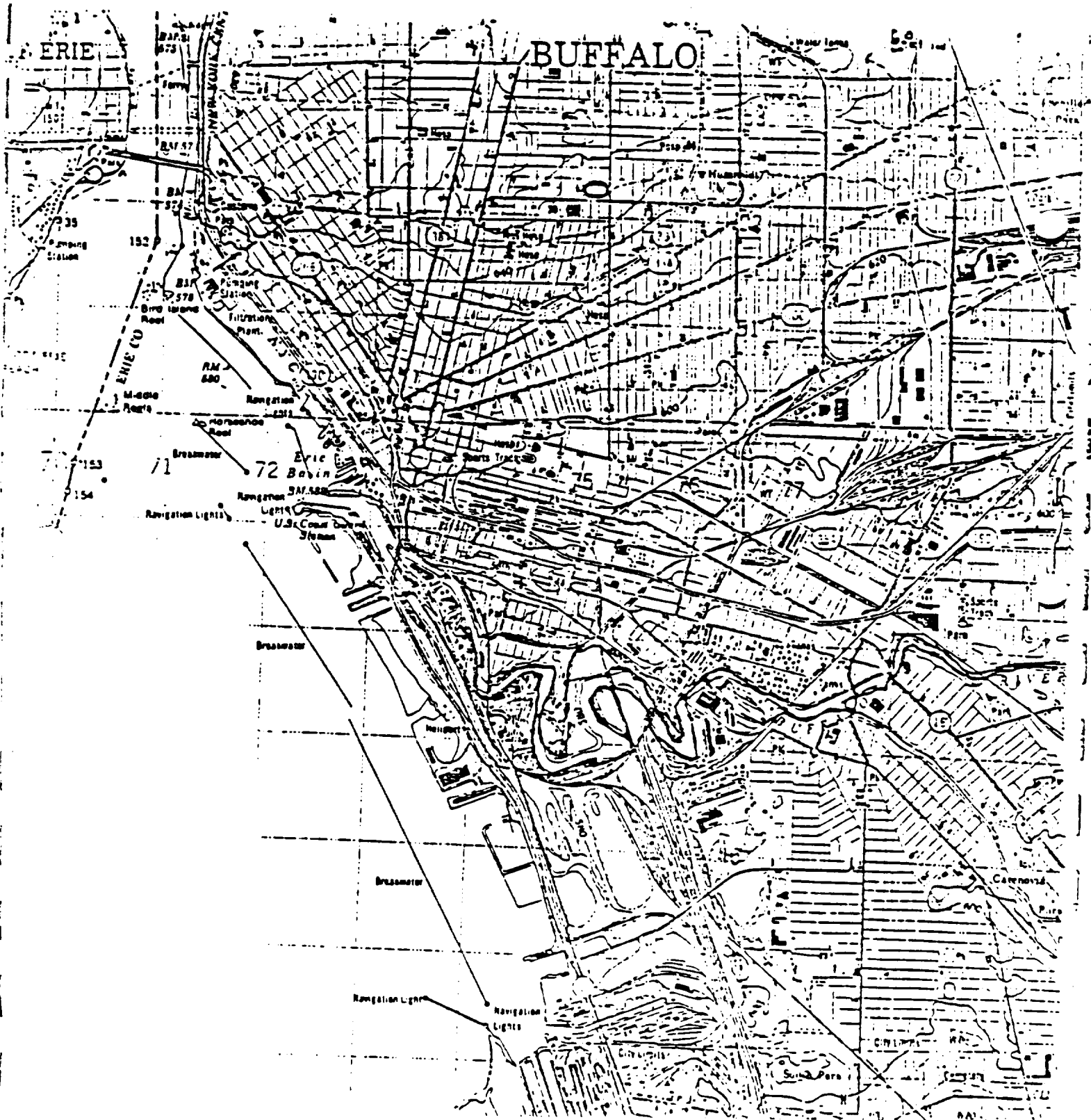
Basin: Lake Ontario

Map Source: Canada Maps 30L/15 - 1974

Scale: 1:50,000

**Jurisdiction:** New York

Figure - Buffalo River





NATURE OF PROBLEM

Types of Problems

Conventional Pollutants  
Heavy Metals  
Toxic Organics  
Contaminated Sediments  
Fish Consumption Advisories  
Biota Impacted

Causes of the Problems

Municipal Point Sources  
Industrial Point Sources  
Urban Non-point  
Combined Sewer Overflows  
In-Place Pollutants  
Waste Disposal Sites

Organics, pesticides, phenolics, coliforms and heavy metals observed in the Tonawanda Channel (U.S.) and in the lower Niagara River.

Water, sediment and fish from the Tonawanda Channel (U.S.) of the Upper Niagara River are severely contaminated. The lower Niagara River, where complete mixing occurs, also exhibits extensive contamination.

Almost all sediments from the Tonawanda Channel (U.S.) are heavily contaminated with conventional pollutants, heavy metals and PCBs in excess of acceptable concentrations for open water disposal of dredged materials. Many sediments are also contaminated with high concentrations of other organic substances primarily from industrial sources.

Sediments from the lower Niagara River generally exceed acceptable levels for heavy metals.

A number of organic compounds have been identified in sediment and water samples taken from the river adjacent to United States industrial landfills.

The benthic fauna is disrupted in the Tonawanda Channel (United States) and in the lower Niagara River. Toxicity is a limiting factor along the shoreline of the upper Niagara River and is also a problem in the lower Niagara River.

Numerous organic chemicals of industrial or agricultural origin have been identified in fish. Advisories are in place for larger specimens of American eel and coho salmon because of elevated levels of PCBs and mirex found in the lower Niagara River; these species are generally resident in Lake Ontario.

PROGRESS TO DATE

Remedial Actions

In Ontario, municipal sewage treatment provided, and industrial compliance at plants located in Province by early 1985. Assessment of possible industrial sources connected to municipal sewerage systems within drainage system proceeding.

In the United States, point sources and in-place pollutants characterized, contribution of some landfills has been documented, others need to still be investigated.

Environmental Improvements

Loadings of toxic metals and organics to Lake Ontario have been greatly reduced due to point source control measures.

Regular waste source monitoring and periodic monitoring of ambient conditions, including testing of contaminants in fish and wildlife will be continued.

STATUS OF REMEDIAL ACTION PLAN (Category: 3/3)

Province developing strategy to address future intergovernmental approach to transboundary pollution of river.

U.S. EPA/State of New York Task Force developing Remedial Action Plans based on the Niagara River Toxics Committee report.

Figure - Niagara River

